

REMARKS

Claims 1-22 were pending in this application.

Claims 11-22 have been withdrawn from consideration.

Claims 1, 2, and 10 have been rejected.

Claims 3-9 have been objected to as being allowable but dependent from a rejected base claim.

Claims 3 and 5 have been amended as shown above.

Claims 11-22 have been cancelled.

Claims 31-40 have been added.

Claims 1-10 and 31-40 are now pending in this application.

Reconsideration and full allowance of Claims 1-10 and 31-40 are respectfully requested.

I. ALLOWABLE CLAIMS

The Applicants thank the Examiner for the indication that Claims 3-9 would be allowable if rewritten in independent form to include the elements of their respective base claims and any intervening claims.

The Applicants have rewritten Claims 3 and 5 in independent form. Based on these amendments, the Applicants respectfully submit that Claims 3 and 5 (and their dependent claims) are in condition for allowance.

Accordingly, the Applicants respectfully request full allowance of Claims 3-9.

II. REJECTION UNDER 35 U.S.C. § 103

The Office Action rejects Claims 1, 2, and 10 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,441,467 to Toyosawa et al. (“*Toyosawa*”) in view of U.S. Patent No. 6,180,445 to Tsai (“*Tsai*”). The Applicants respectfully traverse this rejection.

In *ex parte* examination of patent applications, the Patent Office bears the burden of establishing a *prima facie* case of obviousness. (*MPEP* § 2142; *In re Fritch*, 972 F.2d 1260, 1262, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992)). The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention is always upon the Patent Office. (*MPEP* § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984)). Only when a *prima facie* case of obviousness is established does the burden shift to the Applicant to produce evidence of nonobviousness. (*MPEP* § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993)). If the Patent Office does not produce a *prima facie* case of unpatentability, then without more the Applicant is entitled to grant of a patent. (*In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Grabiak*, 769 F.2d 729, 733, 226 U.S.P.Q. 870, 873 (Fed. Cir. 1985)).

A *prima facie* case of obviousness is established when the teachings of the prior art itself suggest the claimed subject matter to a person of ordinary skill in the art. (*In re Bell*, 991 F.2d 781, 783, 26 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1993)). To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or

motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, and not based on the Applicant's disclosure. (*MPEP* § 2142).

The Office Action acknowledges that *Toyosawa* fails to disclose depositing a "polyimide layer" over at least a portion of a redistribution metal layer and etching the "polyimide layer" to leave at least one portion of the redistribution metal layer open to receive at least one solder bump as recited in Claim 1. (*Office Action, Page 2, Last paragraph – Page 3, First paragraph*). However, the Office Action does assert that *Toyosawa* discloses depositing a "silicone nitride layer" over at least a portion of a redistribution metal layer and then etching the "silicone nitride layer" to leave at least one portion of the redistribution metal layer open to receive at least one solder bump. (*Office Action, Page 2, Last paragraph – Page 3, First paragraph*).

The Applicants believe the Office Action's assertion regarding *Toyosawa* is incorrect. *Toyosawa* recites a semiconductor device that includes various layers, such as substrate 1, silicon oxide film 2, polysilicon film 3, diffusion layers 4a and 4b, CVD-silicon oxide film 5, BPSG film 6, barrier metal layers 8a and 8b, metal layers 9a and 9b, interlayer insulating film 10, barrier metal layer 13, metal layer 14, passivation film 15 (such as a silicone nitride layer), and barrier metal layer 16. (*Col. 6, Line 18 – Col. 7, Line 52*). The semiconductor device also includes a gold bump 17. (*Col. 7, Lines 52-54*).

Toyosawa specifically recites that the passivation film 15 is only formed “at a predetermined area” of the metal layer 14. (*Col. 8, Lines 35-47*). In other words, *Toyosawa* appears to form the passivation film 15 only over a specific portion of the metal layer 14. *Toyosawa* does not appear to etch the passivation film 15 to expose the underlying metal layer 14. As a result, the Applicants respectfully submit that *Toyosawa* does not disclose, teach, or suggest depositing a “silicone nitride layer” over at least a portion of a redistribution metal layer and then etching the “silicone nitride layer” to leave at least one portion of the redistribution metal layer open to receive at least one solder bump.

The Office Action then asserts that *Tsai* discloses the use of a “polyimide layer” and that it would be obvious to replace the “silicone nitride layer” of *Toyosawa* with the “polyimide layer” of *Tsai*. (*Office Action, Page 3, First paragraph*).

Tsai recites a method for creating high-Q inductors in a semiconductor die. (*Abstract*). The semiconductor die includes two polyimide layers 40 and 42. (*Col. 6, Lines 8-14*). Redistribution vias are formed by etching the polyimide layer 40 and placing metal into the etches. (*Col. 6, Lines 34-40; Col. 9, Line 65 – Col. 10, Line 18*). The polyimide layer 42 is also etched, metal 44 is placed into the etches and planarized, and contact balls 46 are provided. (*Col. 6, Lines 51-53*).

The “redistribution vias” of *Tsai* are formed by etching a polyimide layer (layer 40) and then filling the etches with metal. The “redistribution vias” of *Tsai* are not formed by “depositing” the polyimide layer 40 over the vias and then “etching” the polyimide layer 40 to leave at least one portion of the vias open to receive at least one solder bump.

Similarly, the metal 44 of *Tsai* is formed by etching a polyimide layer (layer 42) and then filling the etches with the metal 44. The metal 44 of *Tsai* is not formed by “depositing” the polyimide layer 42 over the metal 44 and then “etching” the polyimide layer 42 to leave at least one portion of the metal 44 open to receive at least one solder bump.

Toyosawa and *Tsai* both fail to disclose, teach, or suggest depositing a polyimide layer over an existing “redistribution metal layer” and then etching the polyimide layer to reveal at least part of the existing “redistribution metal layer.” As a result, the proposed *Toyosawa-Tsai* combination fails to disclose, teach, or suggest “depositing a polyimide layer over at least a portion of [a] redistribution metal layer” and “etching the polyimide layer to leave at least one portion of the redistribution metal layer open to receive at least one solder bump” as recited in Claim 1.

For these reasons, the proposed *Toyosawa-Tsai* combination fails to disclose, teach, or suggest the Applicants’ invention as recited in Claim 1 (and its dependent claims). Accordingly, the Applicants respectfully request withdrawal of the § 103 rejection and full allowance of Claims 1, 2, and 10.

III. CONCLUSION

The Applicants respectfully assert that all pending claims in this application are in condition for allowance and respectfully request full allowance of the claims.


SUMMARY

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Applicants respectfully invite the Examiner to contact the undersigned at the telephone number indicated below or at *wmunck@davismunck.com*.

The Commissioner is hereby authorized to charge any fees connected with this communication (including any extension of time fees) or credit any overpayment to Deposit Account No. 50-0208.

Respectfully submitted,
DAVIS MUNCK, P.C.

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